Course Policy (cont'd)

- **Project / Option 1:**
  - The work on the option 1 project involves:
    - Briefly summarize different RTE numerical solution techniques
    - Solve RTE for the problem of plane-parallel 1 cm thick slab subjected to linear temperature distribution between the walls kept at T_{w1}=500K & T_{w2}=1000K. You can assume that walls are opaque and black surfaces.
    - Consider 3 special cases: (1) non-scattering, but absorbing medium with spectrally-varying absorption coefficient; (2) "gray", absorbing and isotropically scattering medium; (3) non-absorbing, but backward-scattering & forward-scattering media.
    - Solve all 3 cases using: (1) two-flux approximation coded by you (C/C++; fortran; matlab, etc.); (2) discrete ordinate method implemented in any commercial software you'd like to use (Ansys/Fluent, Comsol, etc) or freeware (e.g., DISORT, etc.)
    - Present the radiative intensity and heat flux distributions for all cases, and compare the simulation results with respect to accuracy, convergence, speed.
    - Bonus (extra 5 points): solve a coupled radiative-conductive heat transfer problem for the special case #1 in the slab with *k*=0.1 W/mK using all three methods and compare results.
  - Project deliverables:
    - Bi-weekly progress reports for the instructor's feedback – not graded
    - Final reports (15 pages maximum) for grading – due last week of classes.
    - Include the computer code you wrote as appendix (not counting towards 15 page limit).

Course Policy (cont'd)

- **Project / Option 1:**
  - The spectrally varying absorption coefficient for case (1):

$$\kappa_\lambda = \begin{cases} 0\ cm^{-1} & \rightarrow \quad 0 \le \lambda < 0.5\ \mu m \\ 0.15\ cm^{-1} & \rightarrow \quad 0.5\ \mu m \le \lambda < 2.7\ \mu m \\ 6.0\ cm^{-1} & \rightarrow \quad 2.7\ \mu m \le \lambda < 4.5\ \mu m \\ 100.0\ cm^{-1} & \rightarrow \quad 4.5\ \mu m \le \lambda < \infty\ \mu m \end{cases}$$

  - Scattering phase function for case (3):

$$\Phi(\theta - \theta') = \begin{cases} 3 & 2\pi/3 < \theta - \theta' < \pi\ (\boldsymbol{forward}) \\ 1 & \pi/3 < \theta - \theta' < 2\pi/3\ (\boldsymbol{sides}) \\ 2 & 0 < \theta - \theta' < \pi/3\ (\boldsymbol{backward}) \end{cases}$$

- **Handouts: 3 journal papers are provided on t-square to help with problem formulating/validating the methodology.**